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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/672,159	09/27/2000	Benjamin Bin Jian		6614

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EXAMINER	
MARTINEZ, JOSEPH P	
ART UNIT	**PAPER NUMBER**
2873	

DATE MAILED: 10/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/672,159	JIAN ET AL.	
	Examiner	Art Unit	
	Joseph P. Martinez	2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 July 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,16-18,21-27 and 41-52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,16-18,21-27 and 41-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 September 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of claims 1-8, 16-18 and 21-27 in Paper No. 9 is acknowledged. Claims 1-8, 16-18 and 21-27 are pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-7, 16-18, 21, 23, 27, 41-44 and 46-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kravitz et al. (5,790,730) in view of Meissner (5,846,638).

Re claims 1 and 4-6, Kravitz et al. teach for example, a hybrid microlens (fig. 5b, col. 6, ln. 65-67, col. 7, ln. 1-36), comprising two layers (first layer 30 and second layer 32, fig. 5b, col. 6, ln. 65-67, col. 7, ln. 1-36) that are transparent at a wavelength of interest, including: a first layer that has a low index of refraction; a second layer with said first layer; and said second layer having an optical focusing element formed (microlens 16, fig. 5b, col. 6, ln. 65-67, col. 7, ln. 1-36) on the surface non-adjacent to said first layer, said second layer being substantially thinner (fig. 5b) and having a higher index of refraction than the first layer. The office interprets the teachings of Kravitz et al. in fig. 5b to show relative thicknesses of layers being interchangeable for either layer 32 or 30 and furthermore disclose the limitations set forth regarding functional attributes of reducing microlens sag and sum of the two layer thicknesses. The office also interprets

the teachings of Kravitz et al. (col. 6, ln. 65-67, col. 7, ln. 1-35) to include a combination of layer 1 being glass and layer 2 with focusing (refractive microlens 16, fig. 5b, col. 8, ln. 30-35) means being silicon or a semiconductor (col. 6, ln. 65-67, col. 7, ln. 1-35). But Kravitz et al. fail to teach affixing first and second layers. However, Meissner teaches affixing first and second layers (col. 6, ln. 50-54). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Kravitz et al. with Meissner in order to provide a multilayer optical device with a virtually defect free bond interface of high strength.

Re claims 16 and 47, Kravitz et al. further teach for example, a method for making and a plurality of hybrid microlenses with a first and second layer, said first layer having a lower index of refraction than said second layer and forming a plurality of optical focusing elements (refractive microlens 16, figs. 1 and 5b, col. 8, ln. 30-35) on the surface of the second layer (first layer 30, fig. 5b, col. 8, ln. 30-35) non-adjacent to said first layer, but fail to teach steps of: anti-reflection coating one of said first and second layers and affixing the second layer to the first layer. However, Meissner teaches for example, steps of: anti-reflection coating one of said first and second layers (col. 19, ln. 62-67, col. 20, ln. 1-9) and affixing the second layer to the first layer (col. 19, ln. 12-17). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Kravitz et al. with Meissner in order to provide a multilayer optical device with a virtually defect free bond interface of high strength and enhance the performance of the device by minimizing reflections at the interface via anti-reflection coatings.

Re claims 41, 43-44 and 50-52, Kravitz et al. teach for example, a hybrid microlens (fig. 5b, col. 6, ln. 65-67, col. 7, ln. 1-36), having two layers (first layer 30 and second layer 32, fig. 5b, col. 6, ln. 65-67, col. 7, ln. 1-36) that are transparent at a wavelength of interest, including: a first layer that has a low index of refraction; a second layer with said first layer; and said second layer having an optical focusing element formed (microlens 16, fig. 5b, col. 6, ln. 65-67, col. 7, ln. 1-36) on the surface non-adjacent to said first layer, said second layer being substantially thinner (fig. 5b) and having a higher index of refraction than the first layer. The office interprets the teachings of Kravitz et al. in fig. 5b to show relative thicknesses of layers being interchangeable for either layer 32 or 30 and furthermore disclose the limitations set forth regarding functional attributes of reducing microlens sag and sum of the two layer thicknesses. The office also interprets the teachings of Kravitz et al. (col. 6, ln. 65-67, col. 7, ln. 1-35) to include a combination of layer 1 being glass and layer 2 with focusing (refractive microlens 16, fig. 5b, col. 8, ln. 30-35) means being silicon or a semiconductor (col. 6, ln. 65-67, col. 7, ln. 1-35). But Kravitz et al. fail to teach an anti-reflection coating one of said first and second layers and affixing the second layer to the first layer. However, Meissner teaches for example, steps of: anti-reflection coating one of said first and second layers (col. 19, ln. 62-67, col. 20, ln. 1-9) and affixing the second layer to the first layer (col. 19, ln. 12-17). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Kravitz et al. with Meissner in order to provide a multilayer optical device with a virtually defect free bond interface of high strength and enhance the performance of the device by minimizing reflections at the interface via anti-reflection coatings.

Re claims 2-3, 17-18, 42 and 48-49, Kravitz et al. further teach for example, optical focusing comprising a refractive lens (microlenses 16, fig. 5b) element is formed by dry etching (col. 7, ln. 66-67, col. 8, ln. 1-29).

Re claim 7, Meissner further teaches for example, an antireflection layer is situated between the first and second layers, and said antireflection layer is optimized for the refractive indices of said first and second layers (col. 19, ln. 12-17 and 62-67, col. 20, ln. 1-9).

Re claim 21, Meissner further teaches for example, thinning and polishing a layer after bonding (col. 9, ln. 25-40) and before forming plurality of optical focusing elements.

Re claim 23, Meissner further teaches for example, the step of bonding said first and second layers comprise anodic bonding (col. 3, ln. 5-19).

Re claims 25 and 46, Kravitz et al. further teach for example, an optical fiber (optical fibers 40, fig, 2, col. 9, ln. 49-67) affixed to said first layer, said optical fiber having an end face situated proximate to said first layer (fig. 2, not labeled, but in the area of numeral 38), said optical fiber having a core (fig. 2, not labeled, but in the area of numeral 42) arranged with respect to said optical focusing element (microlens 16, fig. 2) to couple light between said core of said optical fiber and said optical focusing element (fig, 2, col. 9, ln. 49-67).

Re claim 27, Kravitz et al. further teach for example, the optical focusing element (microlens 16, fig. 2) is arranged with respect to said core (fig. 2, not labeled, but in the area of numeral 42) so that said core is approximately at focal point (focal point 38, fig. 2) defined by said optical focusing element (fig. 2, col. 7, ln. 37-52).

Claims 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kravitz et al. in view of Meissner in further view of Stegmueller et al. (5,195,150).

Re claims 24 and 26, Kravitz et al. in view of Meissner teach first and second layers, but fail to teach a non-perpendicular optical surface formed on a surface non-adjacent to optical focusing element, said non-perpendicular surface approximately aligned with said optical focusing element. However, Stegmueller et al. teach for example, a non-perpendicular optical surface (V-shaped trench 12, fig. 1, col. 2, ln. 65-68, col. 3, ln. 1-14) formed on a surface non-adjacent to optical focusing element (lens 4, fig. 1), said non-perpendicular surface approximately aligned with said optical focusing element (fig. 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Kravitz, Meissner and Stegmueller et al. in order to provide a multilayer optical element that also enables an optimally flexible arrangement with other optical or optoelectronic components.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kravitz et al. in view of Meissner in further view of Funami et al. (5,200,010).

Re claim 22, Kravitz et al. in view of Meissner teach for example, forming a plurality of optical focusing elements (Meissner - refractive microlens 16, figs. 1 and 5b, col. 8, ln. 30-35), but fail to teach forming optical focusing elements before bonding first and second layers. However, Funami et al. teach for example, forming optical focusing elements (lens 1, fig. 1A, col. 3, ln. 50-68, col. 4, ln. 1-45) before bonding first (flat glass plate 2, fig. 1C) and second (lens 1, fig. 1D) layers (col. 3, ln. 50-68, col. 4, ln. 1-45). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Kravitz et al., Meissner and Funami et

al. in order to provide a multilayer optical device which can be manufactured with high accuracy and low cost.

Claims 8 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kravitz et al. in view of Meissner in further view of Lur et al. (5,449,630).

Re claims 8 and 45, Kravitz et al. in view of Meissner teach for example a second layer, but fail to teach a plurality of trenches that divide the layer into a plurality of portions thereby providing reduced mechanical stress. However, Lur et al. teach for example, a plurality of trenches (trenches 62 and trench 55, fig. 4D, col. 4, ln. 47-57) that divide the layer into a plurality of portions thereby providing reduced mechanical stress (col. 4, ln. 47-57). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Kravitz et al., Meissner and Lur et al. to provide a layer with a trench system that can reduce the accumulation of the structural stress.

Conclusion

Response to Arguments

Applicant's arguments filed 7-11-03 have been fully considered but they are not persuasive. Re applicant's argument on p. 11-13, wherein the applicant argues that Kravitz et al. does not provide a layer of high refractive index, Kravitz et al. teach a variety of materials (col. 6, ln. 65-67 to col. 7, ln. 1-8), a layered structure from different materials (col. 7, ln. 9-11) and the ability to optimize the layered structure for different purposes (col. 7, ln. 14-16). Furthermore, by applicant's own admission (p. 14, last paragraph), Kravitz et al. use a material of high refractive index, namely a semiconductor

material (col. 7, ln. 2-3). Therefore, Kravitz et al. in combination with further prior art teach all claimed limitations as disclosed above.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph P. Martinez whose telephone number is 703-305-0577. The examiner can normally be reached on M-F 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached on 703-308-4883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-4883.

JPM
September 17, 2003

Hung Xuan Dang
Primary Examiner